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	Men	Total Absences	Average Absences per Man
Freshmen.....	115	702	6.1
Sophomore.....	81	662	7.9
Junior.....	83	623	7.5
Senior.....	79	580	7.3
	358	2,567	7.17

Of this total number of absences 431 were due to athletics. This includes not alone the absences of the members of teams, but also of students absent to attend games. This number amounts to 17 per cent. of all the absences, but is less than one half of one per cent. of the total number of class periods involved.

795 of the absences were due to sickness, or were so reported. These figures do not attempt to go back of the reasons given for failure to attend class. *At least* 795 absences were so accounted for. It is quite possible that the number should be larger and that the reason was not in every case noted in the record book. This number is 31 per cent. of the whole number of absences, and added to the 17 per cent. caused by athletics accounts for 48 per cent. of the whole number. Of the absences, 52 per cent., or an average of 3.7 per man, were accounted for by various other excuses.

In the practical handling of the excuses, upper-class men are excused without much question as to the quality of the excuse if the number of absences for the semester has not exceeded six to eight. If the number of hours per week for each man is estimated at 15, a normal amount, the total number of absences would amount to 2.6 per cent. of the class periods involved. Or, looking at it in another way, the average attendance of the men for the semester is 97.4 per cent.

The figures from which these percentages are derived are as follows:

$$\frac{\text{Men}}{358} \times \frac{\text{Classes per week}}{15} \times \frac{\text{Week per semester}}{18} = 96.660$$

$$\text{Total number of absences} = 2,567$$

$$\text{Percentage of absences, 2.6 per cent.}$$

If 15 cuts a semester is somewhere near the number usually allowed the following figures

are of interest: of the 115 freshmen 103, or 90 per cent., had *less* than 15 absences; of the 81 sophomores 66, or 81 per cent., had *less* than 15 absences; of the 83 juniors 74, or 89 per cent., had *less* than 15 absences; of the 79 seniors 68, or 86 per cent., had *less* than 15 absences.

The writer submits these figures that they may be compared with the results in other institutions, especially those where some form of the cut system is in use. It is the feeling of the writer that the fact that *each* absence has to be accounted for acts as a deterrent in a large number of cases, when the student would easily absent himself under the cut system.

Each instructor is furnished with blanks and is asked to report the absences for each day. These blanks are deposited in boxes adjacent to the classroom and are collected and entered in the record by a clerk. The scheme to be effective must enlist the support and cooperation of all instructors. The instructors must, of course, attempt to see that all absences are reported. The figures given are for absences actually reported. It is recognized that, owing to human frailty, a certain number are not reported. That same lack exists in any system that has yet been devised. The percentage of absences not reported is, I believe, small. May we have figures from other institutions? The figures I have given here would seem to indicate that a smaller number of cuts might prove feasible in those institutions that use the cut system.

I doubt if we have any scientific basis for estimating the number of excuses that a man is normally entitled to receive during a semester. Perhaps some figures of this kind will give us a start toward such a basis.

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SCIENTIFIC BOOKS

The Infancy of Animals. By W. P. PYCRAFT. With 64 Plates on art paper and numerous Illustrations in the text. New York, Henry Holt and Company. 1913. Pp. xiv + 272. It would be difficult to find a more fasci-

nating theme in the whole realm of zoology than "The Infancy of Animals," and we think that the author of the work under this head has succeeded admirably in a difficult task—that of presenting a generous measure of significant fact, with due regard to scientific accuracy, and in readable English. Students of the invertebrates might feel that he was hardly justified in saying that the "childhood" of animals was a subject which has been strangely neglected. Yet this criticism would apply to most of the higher animals, with which he is mainly concerned. Take from the shelf any standard work upon mammals or birds, and you will look in vain for any adequate accounts of the young in most of the species described. If one were to consult a large museum instead, with but few notable exceptions, this neglect of the juvenile period of life would be even more apparent.

The infantile, juvenile, or adolescent phases of animal life, whatever be the names by which we attempt to classify the post-embryonic phases of development, which lead to the adult state, are not only difficult to correlate with reference to the "accident" of birth, but they are often exceedingly difficult to study. In many cases, our meager information is due to want of opportunity, rather than to lack of effort. Students who have worked for months at the seashore in the vain endeavor to trace a difficult life history, or who have tramped unnumbered miles in search of a particular bird or beast, in order to study its young, certainly need no admonition on this score.

The early post-embryonic life of animals embraces a very large section of zoology and psychology, and is of equal importance for comparative anatomy and evolution. The reader will find anatomical and evolutionary problems freely discussed, but the psychology of behavior does not come within the aims of the present work. Of the fourteen chapters of text, all but two of which deal with vertebrates, the most noteworthy are the three devoted to birds (Young Birds in the Nursery, Coloration, and Young Birds and the Records of the Past, Chaps. V.–VII.), a field in which the author is well known by his excellent "History

of Birds," and numerous special contributions. These, as well as the remaining sections, are filled with pertinent and interesting facts, drawn from a wide field, and are imbued with the spirit which, after learning how, is not satisfied until it knows why.

Of the many perplexing problems which the coloration of animals presents, the retention of stripes in the livery of the young and adult, or in that of the young alone, is of special interest to students of evolution. The author maintains the Darwinian thesis that this character of the young is reminiscent of an ancestral condition. The primitive striped pattern has often been allowed to persist in the early stages of life, because it was either a direct source of protection, or at least because it was not harmful. In other words the mantle of the forefather has been thrust upon the juvenile descendant to protect him, in the absence of its parents, and has often been left there when of no further use. This longitudinal striping, which is found in representatives of all the vertebrates, is not only more characteristic of the young than of the adult, but is more common in species which have retained the greatest number of primitive characters. In the course of growth the stripes tend to break up into spots, which may be retained, or disappear, when the animal becomes uniformly colored. The nestlings of the emu and cassowary, the most primitive of living birds, as the author shows, are more or less completely marked over the entire body with a series of light stripes, on a dark ground, but these marks disintegrate, giving way to an adult plumage of uniform tint. The same conditions are repeated in the unrelated grebes, and in other groups of birds where striped nestlings occur, these markings tend to break up into spots that may be retained or disappear. Similar phenomena occur in mammals. The leopard may be unable to change his spots, or the tiger his stripes, but the lion can, or has, for his cubs still bear the birth mark of an ancestral spotted state.

Admitting the power of selection, through variation and heredity, to effect such changes for the better protection of young and adult,

our difficulties of interpretation are not at an end. How, upon the same principles, shall we account for the rather startling exceptions which confront us at every turn—the zebra, for instance, “the noblest Roman of them all,” so far as this kind of livery is concerned, in which not only the young, but both sexes, are striped all over. For untold ages, so far as we can judge, zebras have haunted the open, sun-scorched veldt of South and Southeast Africa, where their conspicuous coats, seen from afar, are the boldest advertisement possible to their numerous enemies; yet they managed to thrive, at least until the white man appeared upon the scene with a rifle, and no satisfactory solution of the meaning of their stripes has yet been offered. How then are we to account for an assumed striped ancestral livery in so many animals, whether young or adult? As Darwin remarked, since in the horse family both sexes are colored alike, there is no evidence of sexual selection here, and if stripes and spots originated as ornaments, how does it happen that so many animals in their present adult state have lost them?

The parental care and affection afforded to offspring, so strongly evinced in the mammal and bird, can be followed in all its various degrees of manifestation to invertebrates of very lowly estate. The author has recorded a number of remarkable instances in birds, wherein interpretation is difficult, and perhaps impossible without a much fuller knowledge of behavior in every direction than is now possessed.

Bats have been seen to capture prey, when loaded with their young, and many birds in times of stress are equally independent, not only transporting their young from place to place, but even transferring their eggs, though, excepting the gray cuckoo, well authenticated cases of egg-transport are extremely rare. The great northern diver or loon is an adept in thus dealing with its young, as is also the lesser grebe or dabchick, mentioned by the author. More remarkable still is the way in which woodcock will sometimes carry their nestlings to and fro, from nest to feeding

grounds, holding them, as we are told, apparently between their legs, and possibly with the further aid of their long bill placed underneath for support.

The author raises a more vexed question in his descriptions of the diving and fishing habits of certain birds, and their methods of dealing with their prey, as to whether the young really receive direct and deliberate lessons from their parents in all these things. If we were to ask the preliminary question, whether animals that are directed so completely by instinct need a teacher of this sort, we should be obliged to answer plainly in the negative. In this respect, so far as we can see, the different species of birds stand very nearly at a level, and in every case instinct, perfected by practise, or corrected by individual experience, and often aided by imitation, seems amply sufficient to guide the majority aright in every important vital activity. “What flight is to the eagle,” says the author, “diving is to the nestlings of the auk tribe, grebes, and divers. . . . In acquiring the art there can be no doubt but that the young are instructed by their parents. The adult razor-bill has been seen to take her nestling by the neck and dive with it, many times in succession; and as these excursions seem to be anything but pleasant at first, the young one often dives for a moment to dodge its zealous parent, thus effecting the end to be attained. Young grebes are certainly given lessons in diving, and also in catching fish” (p. 68). A description follows of what the author regards as a diving and fishing lesson given to a young grebe by its parent. Later he says: “Young birds of prey receive instruction first in the art of breaking up their food, and later in its capture,” and Macpherson’s interesting story of the golden eagle is quoted in confirmation of these ideas.

We are quite ready to believe that the remarkable behaviors of the species referred to in the preceding statements have been accurately reported, but we doubt if the interpretation, though apparently so obvious and natural, is really correct. Such interpretations do not fit, when we closely study be-

havior in other directions, and in other species of birds. They do not comport with the workings of instinct in the great avian class. Flight, diving, the capture of food and its treatment, all seem to be as certainly provided for in the inherited stock-in-trade, as either nest-building or song. Young gulls, up to the time they take to the water, beyond which I have never been able to watch them closely, certainly get no direct instruction in regard to their food, but plenty which is indirect, and from the time they desert the family preserve they feed abundantly on insects. The parent is not only *alma mater*, but the great quickener and director of inherited impulses in the young, while at the same time she is the most fascinating model for them to copy. Aside from bodily protection and other minor services, the lack of this parental factor is hardly appreciable in the incubator-reared chick, but is much more apparent in a hand-reared American robin or nestling of any other altricial species, where the transition between simply taking what drops from heaven, and going about to search for it, are more difficult to compass. The impulses are in any case natural, though they can not be forced. That there is a "school of the woods" we do not deny, but we regard it as an easy "school," in which the "teacher" has a natural gift to impart and the "pupil" an inherited tendency to receive.

It is gull-nature to dally with the food in the presence of the young, laying it on the ground and picking it up again, and even putting it back in the "pocket," if it is not quickly mastered, and it is gull chick-nature to follow every movement of the parent, putting head to the ground to get the food, when this is dropped. In such ways, perhaps, a useful lesson, in looking to the ground as an early source of food, is gradually instilled. But this is probably of small consequence, for most inexperienced birds peck instinctively at attractive objects, and all the more readily if these are in motion.

Young hawks, which we have taken from the nest before they were able to stand, and reared in cages, when first introduced to live prey,

such as frogs, rats and pigeons, dealt with it in every case in the most uniform and precise manner, and this way was characteristic of their race. Before getting such food they will even seize chips and grass, and practise what we may call "play at catching frogs and mice." They will approach the chip cautiously, crouch, squeal, strike, seize, and spread over it as if it were really alive, inflicting blows upon it with the tearing, ripping-up motion, with which they would treat an actual frog or a piece of meat.

What then was such a bird as the grebe, referred to above, about, when unceremoniously ducking its youngsters? It might be that it was imparting a genuine lesson in diving, of the direct sort, that is, given with a motive, in recognition of its progeny's needs, but we have gone to this length to point out that this supposition does not exhaust all the possibilities. It might be that the parental instincts were on the wane, or that their sequence was disturbed, for many birds, of which the moor hen has been noted by Howard, instinctively drive off their young, as soon as they are able to shift for themselves, teasing, pecking, and harrying them unmercifully. It would be important to ascertain if the grebes ever display the same instinct. A wider knowledge of grebe-play, cleaning, and other instinctive procedure, might afford further suggestions.

We could refer to parallel and even more striking cases in illustration of the difficulties of interpretation. During courtship most birds perform antics of some sort, in the course of which they spread and move their wings and tail and erect their feathers. Since many, like the gay and lordly peacock, are richly decorated, what more obvious interpretation than that this spreading is a form of display, a showing off of all their finery, in order to charm the female. This, as is well known, was Darwin's interpretation, and formed the basis of his theory of sexual selection, or as it is now often called, preferential mating. But more recent and more exact studies upon the whole course of sexual behavior, of which I would cite particularly the illuminating work of

Howard on the British warblers, have shown that these spreading movements are typically reflex, and that they are common to many periods of excitement, so it is probable that they really have nothing to do with "charming" the female, in the sense in which this word is commonly understood. Even the dull cat-bird can be seen to spread before a prospective mate, and as Howard has shown, the presence of the female is not always necessary to excite such behavior during the mating period. Essentially the same movements are executed at the instance of sudden sounds, or of fear, not to speak of the spontaneous antics of the turkey gobbler, or even of the gaudy peacock, which, as Darwin acknowledged, will spread in the presence of poultry and swine.

In a chapter on Reptiles and their Progeny, the author refers to the ancient story of the viper "swallowing" her young in times of danger, with the remark that since this reptile is viviparous, many persons who had supposed that they had taken its young from the alimentary tract had really assisted at their birth. Whether there is any germ of truth at the root of this hoary belief, or whether it rightfully belongs among the vulgar errors to which Thomas Browne consigned it in the seventeenth century, we do not pretend to say, but the author's suggestion does not remove all the difficulties. Many American naturalists of repute have supported the contention that certain snakes do occasionally refuge their young in the throat or esophagus, and numerous American species, both venomous and non-venomous, are included in the list. It is a matter of some historical interest that the American Association for the Advancement of Science, which met at Portland, Maine, in 1873, held in one of its sections a sort of convention on snakes. G. Browne Goode, who afterwards became the head of the United States National Museum, led the discussion, and F. W. Putnam, secretary of the Association, Theodore Gill, and other prominent naturalists took part in it. Goode's paper, which was suggested by a still earlier one by Putnam, in the *American Naturalist* for 1869, and was published in full in the Annual Re-

ports of the society, was an attempt to show that many snakes give temporary refuge to their young, much as certain fishes are known to carry about and protect their eggs in their mouths. He received the support of all these men, in addition to that of one hundred other witnesses whom he considered reliable, including Sidney J. Smith, noted for his accuracy as a marine zoologist, and Edward Palmer, of the Smithsonian Institution. So strongly was this "viperine" story supported that Dr. Gill, in summing up the evidence, declared it was "sufficient to set the matter for ever at rest." This will illustrate in still another direction the difficulties of interpretation in animal behavior, whether actual or visionary. If such competent witnesses and judges were deceived, it must be due to some other cause than that which the author of "The Infancy of Animals" has adduced. It may be that the young of many snakes—and this is an idea which we owe to a somewhat old but excellent work by Miss Hopley—respond instinctively to the calls of their parent by running towards her head and afterwards concealing themselves under her body. If young snakes were thought to be seen running into the mouth, it would require but little imagination to see them pop out again, the mind having already, perhaps, pictured such a scene in advance. Otherwise, so far as we can see, if we discredit all these accounts, we must continue to regard the snake as the fruitful cause of all moral obliquity.

The author's illustrations, particularly the photographs, are excellent, and add distinctively to the attraction of a valuable and interesting work.

FRANCIS H. HERRICK

LAUSANNE,
June 20, 1913

Explosives. A Synoptic and Critical Treatment of the Subject as gathered from Various Sources. By Dr. H. BRUNSWIG. Translated and annotated by CHARLES E. MUNROE, Ph.D., LL.D., and ALTON L. KIBLER, M.S., Ph.D.

The excuse for producing a new book in the